



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



Oculo-didactics Or Eye Culture

Charles Henry Taylor



460s

721

C.2

0555



4605

GLENN WINSLOW

OPTOMETRIST

711 STORY BUILDING

LOS ANGELES, CAL.

This Problem calls for reason.

"He who will not reason is a bigot;

He who cannot is a fool;

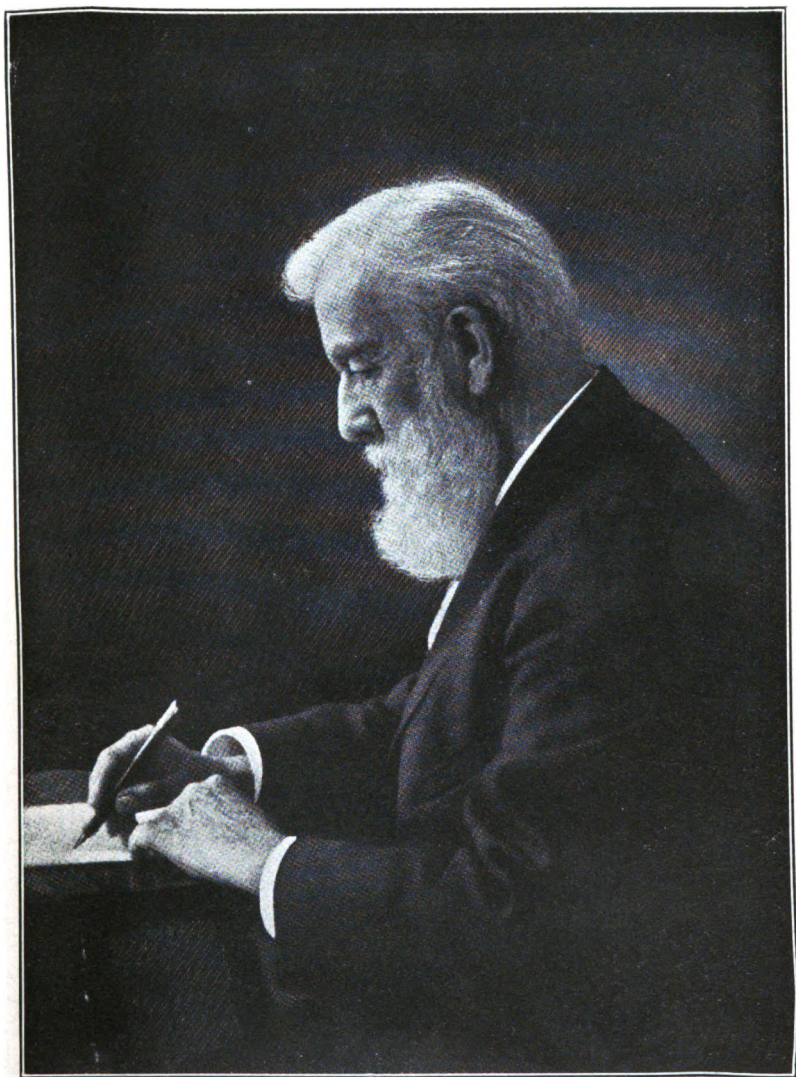
He who dare not is a slave."



THE AUTHOR
IN
1879

JAN 29 1916

GLENN WINSLOW
OPTOMETRIST
711 STORY BUILDING
LOS ANGELES, CAL.



Photogravure from the fine
steel engraving by Clark in
the History of South Dakota

C. N. Taylor

OCULO-DIDACTICS

OR

EYE CULTURE

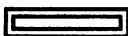


BY

CHARLES HENRY TAYLOR

A SYSTEM OF EYE TRAINING
USED FOR MANY YEARS BY THE
ORIGINATOR AND FOUNDER IN
PUBLIC SCHOOLS, COLLEGES
AND STATE INSTITUTIONS
AND PRIVATE PRACTICE. ●

PRICE ONE DOLLAR



0555
46 C.
TAY
C.2

Published by

OPTOMETRY PUBLISHING COMPANY

KANSAS CITY, MO.

THE LIBRARY OF THE
LOS ANGELES SCHOOL OF OPTOMETRY
958 W. JEFFERSON BLVD.
LOS ANGELES 7, CALIF.

OPTOMETRY LIBRARY

**COPYRIGHT 1915
OPTOMETRY EDUCATIONAL BUREAU**

RE925
T31
OPTOM

CONTENTS

PREFACE	11
INTRODUCTORY	13

CHAPTER I.

PRINCIPLES OF OCULO-DIDACTICS	19
---	----

CHAPTER II.

OCULO-DIDACTICS IN SCHOOLS	27
--------------------------------------	----

CHAPTER III.

OCULO-DIDACTICS IN SCHOOLS—Continued	35
--	----

CHAPTER IV.

OCULO-DIDACTICS IN GENERAL PRACTICE	41
---	----

CHAPTER V.

OCULO-DIDACTICS IN GENERAL PRACTICE—Continued	51
---	----

CHAPTER VI.

OCULO-DIDACTICS IN GENERAL PRACTICE—Continued	57
---	----

CHAPTER VII.

OCULO-DIDACTIC PROCEDURES	63
-------------------------------------	----

CHAPTER VIII.

GENERAL OCULO-DIDACTIC EXERCISES	69
--	----

P R E F A C E

In 1707 Antoine Maitre-Jan gave a description of complaints which he thought "Arose from the strain of the eye." In 1824 Dr. W. Kitchen wrote of "People who required glasses, but neglected to use them." In 1832 Willer enumerated several "symptoms arising from strained eyes." In 1837 Sichel mentioned "a group of symptoms, arising from excessive use of the eye." In 1850 Piorry said that "Oscillation nerve-ness had its seat in the eye." In 1867 the author asserted that he "could see no reason why the eye could not be improved by proper culture, as well as any other organ."

Since then the author has been much interested in the technics of visual images with the result that, he has become a confirmed expounder of scientific eye-culture. In view of what Fauchet said: "No author is so poor that he cannot be of some service," we hope that this effort may not be fruitless.

"The book to read is not the one which thinks for you, but the one which makes you think." This contribution is not designed for lazy readers, or those who require their thinking to be done for them. The aim is to invite thoughtful attention to universal principles, and thus prompt professionals to carefully distinguish pedantries and artificialities from the real-istics, so as to heed the best interests of patrons without being hampered by empiric rule dictations.

OCULO-DIDACTICS

■ ■ ■

INTRODUCTORY.

Pedagogic theorizing is perennial and boundless in speculation for writers. But most efficient readers have a philosophy of their own, so the first thing they wish to know is what is the author's philosophy. A writer's philosophy may not be popularly recognized, nor be in unison with any technical system extant, but it often has an unconscious subtlety which gives a strong bias to the writer as well as to the reader.

But through it all, Dame Nature continues to operate exactly according to her own way of doing, before which the exquisite philosophical wisdom of writer or reader collapses into insignificance. One's philosophy may be philosophic enough to serve somewhat as an instrument with which realities may be influenced in results. Yet it often serves as an anti-ingenious and an anti-investigative force to impede rather than to prompt inductive logic from the study of the conditions which harmonize with nature. Perhaps, in no art, is it more essential for skilled operators to obtain a clear understanding of nature's conditions, and to know the peculiar properties of the material they are dealing with, than in didactic art, in general, or in Oculo-didactic art, in particular.

Scientific eye-culture is a plain phase of didactic art by which the eyes are brought to betterment accord-

ing to nature's mode of developing the human faculties. Eye-culture not only benefits the normal eye in its physical activities and in its accuracy in seeing, but it is a means of guarding against abuses of the eye, and prevents many derangements due to its school and clerical uses. Many acquired troubles of the eye can often be modified and some entirely counter-balanced by proper eye-culture. It not only prevents much of the acquired ill results from abuse of the eye, but it is a practical means for the training of normal eyes, better to sustain the tax that is imposed in practical life work, which requires ability to see accurately and continuously.

This culture is to the eyes what physical training is to the bodily structure, or in other words, it is physical culture applied to the eye in a suitable manner. Of course deficiency in native ability is insurmountable, but by proper culture the capability of the eye can be greatly improved in flexibility, power, ease, harmony, endurance and proficiency, also its accuracy and acuteness in vision can be greatly increased.

The author takes the position that reasonable influence properly exercised upon the eye may effect excellent results, while unfavorable influences and adverse conditions may effect results which are detrimental to the eye and in many cases seriously affect the whole being.

Many readers seem to consider it essential for a writer to fully elaborate upon the application of exact ways and means of doing things for the benefit of those who are not so informed as to be masters of their profession. But, as before indicated, the plan of the writer is, first: to INVITE attention and a consideration of principles upon which the subject is based, rather than to elucidate methods of doing by rule, for

rules are empiric, but principles are eternal and flexible truths.

There is more or less hankering for superior knowledge by rule because the understanding of principles requires the exercise of wisdom to comprehend them so as to use them rightly. But principle, in the sense we use it, is the fundamental truth or essential element used as the primary proposition of true philosophical science, and the issue at stake is the ground of justification as the means to an end in didactic results. The cognate problem is practical results and the ransacking of nature's laws for means to attain the required results.

These chapters will be mainly confined to a few of the eternal principles, essentially involved for intelligent and thoughtful professionals to consider according to their own philosophy, and to make use of as circumstances may admit in grappling with the conditions as found in their every-day practice.

While there is no attempt at exhaustive detailed elaboration of how to do in all cases, we hope that whatever the contribution may lack in serving those who require their thinking to be done for them, it may not cause a misunderstanding of the essential principles by the more thoughtful, if what follows is correctly understood. And while Oculo-didactics affords a wide field and a profitable one, in the matter of benefit to humanity, as well as the more sordid one of dollars and cents, it has its limitations of utility, as well as other classifications in ophthalmic science. It is a part of the specialist's duty to discriminate and proceed according to the peculiar conditions of each individual, and to keep within range of his qualifications to serve the best interests of his patrons.

This brief summary of the author's reflections for many years has quietly waited for an auspicious time for its dedication to those professionals who realize the necessity of heeding nature for results in eye conditions rather than in forcing abnormal developments or mechanical "assistance".

In view of the fact that this is such an unfamiliar subject in more senses than one, it seems advisable to refer to a list of practical results attained by the employment of this science to indicate a possible range in utility by others. The list of brief excerpts, culled from statements of reliable men, is to indicate that this new problem is not unworthy of careful consideration by thoughtful professionals. These testimonials are but a few from among the many in possession of the author, relative to results of Oculo-didactics, as practiced by him in the schools and colleges.

"Dr. C. H. Taylor's work has been eminently satisfactory, and our records show that both health and scholarship have been much improved in those who have followed his teaching and system."

"Dr. C. H. Taylor's work has almost without exception, done great good. His general advice is excellent."

"The students and faculty of the State Agricultural College of this State have reaped great good from Dr. Taylor's services during the past two or three years. I believe that the eyesight and health of many students have been saved by his services."

"Dr. C. H. Taylor has several times examined the eyes of our students and the benefits resulting to the children cannot be over-estimated. Many sad cases have been cured, and others much helped by following his system of Oculo-didactics."

"The principles of Eye-Culture are as true as any taught and will live as long. I have seen it demonstrated in the schools."

"Having had excellent opportunity in connection with my college work to become familiar with the work of some of the most noted eye specialists in the West, I take pleasure in saying that Chas. H. Taylor ranks among the best and most successful operators I have ever met."

"I have great confidence in Oculo-didactics and am very much pleased with the work here."

"Having given considerable attention to the subject of ophthalmology and witnessed the work of prominent specialists, I have become convinced that Dr. C. H. Taylor's work is thoroughly original and fraught with the best results of any system extant."



PRINCIPLES OF OCULO-DIDACTICS.



CHAPTER I.

It is a well-known criterion of excellence in any procedure, that it depends much upon its fitness for accomplishing the objective purpose, and its real value is estimated by its worth to man. In considering this new problem its value depends much upon unfamiliar realities which can be consistently employed so as to benefit those who strive to make it pay. If there is no strife to test it, then it is proportionally a waste of energy. This principle may be applied to the reader and the patient, regardless of its possible value to the world. Therefore, the true valuation of this new problem depends much upon co-operative effort. Our trust and main dependence is upon the interest aroused among progressive professionals who can and will try to reason and make an effort to sift the matter carefully, so as to cull the realities to nourish their own mental understanding of the universal principles involved.

A correct understanding of Oculo-didactics, even to those best posted in the science, cannot be reached in a single bound, or brainless efforts to echo some *ipsi dixit* dictation without understanding the universal principles involved, which vitalize the procedure. The first effort is duly to consider what mental ability is directly taxed in order to learn the requirements in regard to the anatomical structure and physiology of the eye as set forth in books—also that tendency now to learn some of the pathological

conditions; also the science of arithmetic sufficient to understand the subject of refraction, and thereby estimate the errors of, and the fellowship relations of the two eyes. In order to become an efficient master of Oculo-didactic science, it necessitates this knowledge of optometry, combined with suitable knowledge of didactics, physiology, atavism, idiosyncrasy, and psychological sciences; in order to estimate what the true discordant conditions of the eyes are, when in the act of seeing, and to understand how to equipoise all of the discordant relationships when designing procedures, or glasses, best to enable the eyes to perform their functions according to nature, in obedience to the influence of mind and will of the individual.

Hence, while Oculo-didactics is embraced in ophthalmic science, it invades a field of science, that is far from being one in practice or in results. The suitability of either for attaining the most valuable and reliable results in benefiting the afflicted is the true criterion as to their relative merits.

The study of Oculo-didactics calls for the exercise of unbiased reason, for, take whatever course one may decide upon, he has to deal directly with Nature's laws. Therefore, an efficient operator must carefully observe and reason as to causes and effects in order to determine intelligently upon the most probable so as to resolve upon a suitable course upon which to act. The most suitable procedure in many cases would be wanting in others where errors of refraction, according to optometry, appear very similar, and are often fitted alike, regardless of the fact that there are no two pairs of eyes exactly alike, and it is irrational to attempt to treat unlike things in any like manner unless it is to destroy. So we repeat: The essential problem in Oculo-didactics is to decide just

what are the factors to be heeded in order to equipoise all of influential conditions so as to derive the best results. And this cannot be attained by brainless devotion to any authority, it matters not how "high" or popular that "authority," or how "classic" the course of one's education, because such guidance when standardized becomes crystallized; and any crystallized guidance by rules has no elastic principle of organic ability, or the real truths of Nature. Hence the keynote of Oculo-didactics is in learning how to understand each individual as a whole so as to become better able suitably to co-ordinate the procedures with various natures, for when harmony of Nature's conditions is interfered with, there is a discord.

We deem it unnecessary to enter upon detailed guidance for professional procedure, for specialists are supposed to be posted in their particular fields, and excellent works upon all of those subjects are easily obtained to refresh the mind, if desired. Therefore, it becomes necessary only for investigators independently to observe and reason so as to exercise good judgment and ingenious intelligence in trying to understand each individual case, and in designing special procedure in this professional artistry, so as to attain excellent results. And in this, one must act independent of authority, rule, system, fondled notion, cherished belief, confidence, prejudice, or any other bias.

The power of mind to observe correctly, so as to perceive the realities and to understand their harmonious relationship in nature's work is the course in each procedure, so as to influence or sway the natural forces correctly, for in all cases there must be unlimited consequences which correspond absolutely according to the combination of nature's forces and the art employed.

It is an axiomatic principle in Oculo-didactics that when the combined activities of the eyes are in unison, the result is harmony in functions, and when there is any discordant relation there is some inharmonious condition which tends to strain, if not to enfeeble the eyes. The completeness of an optometric undertaking depends upon all parts being in harmony with all other parts, individually and collectively as a whole. **The eye can be complete only so far as all parts and powers have their full and legitimate activities in complete harmony.** Efficient service in Oculo-didactics necessitates a careful study of the make-up in alacrity of motion, pose of head, shoulders and chest; the expression of mouth; appearance of nose; throat and ears, as well as of the eyes, for they are all language of Nature, pertaining to the eyes. It is also necessary to test the acuteness of the senses and mental acuity so as to note any demure, relaxed indications, or flabby manifestations, for they are all truthful expressions of the predisposed tendency or results of eye conditions. There is a peculiar degeneracy of eyes from the same cause. The entire range of human quality from the strong, robust and healthy organism, to the most feeble being, and their experiences are factors as to the probable conditions of eyes, besides the mere errors of refraction, to be heeded in glass fitting.

Physiology is an essential branch of information, because all the functions are factors of the entire being, according to its nature and experiences, and the reflexes often play a part in the eye conditions.

All the human family are not exactly alike; they not only differ in size, shape, complexion, skin, hair, features, head, limbs and color, but in mind and eye. The "New Physiognomy or Signs of Character," by Wells, is a valuable assistance in the study of man,

in various respects, without encroaching upon the immortality songs. And what is true of physiognomy resting on character is no less true of eye conditions resting on physiology, for there is a universal law of correspondence of effects in efficient forces.

It is well known that "round apples grow on round topped, short limbed and thick bodied trees, and oblong apples on tall, long-limbed trees." Should it be incredible therefore, to say that round heads, faces and eyes may be predicted of round, plump bodies, and that high heads and long faces and bodies indicate corresponding eyes. Incongruity in homogeneous organs will interrupt harmonious relationship of parts and cause discord, and it is no less true in regard to eye functions being harmonious with other functions.

The law of homogeneousness wherein every part of a being corresponds with every other part and with the whole is so reliable and conformable that, lay before such scientists as Professor Owen a single bone of an animal, and he can construct the entire osseous frame-work and clothe it with muscles according to its original structure. When a single scale of a fish was placed before Professor Agassiz, he was able to do the same regarding the original fish. The law of homogeneousness regarding human physiology and the eye function is no less true.

The growth or development of the different parts or organs of the body is normally uniform, the tendency being to keep unimpaired, or if impaired, to restore the symmetry or harmony of the work. "Exercise (within certain limits), by attracting the vital currents, strengthens and increases the size of the organ or part exercised—therefore, when any organ or part is disproportionately exercised or excited, it is correspondingly developed and the harmonious re-

lation of the parts is impaired." And that law is no less true regarding eye conditions, therefore, important.

It is impossible for man to contribute reliable, detailed directions beyond universal principles; but it may be said that essentials in Oculo-didactics are those principles embraced in atavism, or recurrence of the original type in the progeny of its varieties; in physiology, or the science which deals with the phenomena of life of living beings; in psychology, or science of mind; as embraced in the science of teaching or training. Intelligent research in this field of realities will soon reveal that it does require a due consideration of atavism, because the inherent proclivities arising from the original type of ancestral nature may be a very important factor in the nature of the eyes; therefore, it has to be duly heeded in order to harmonize the procedures with each individual nature. The eyes are a part of the whole being and are subject to the same laws of causation, both in the atavistic natures and their experiences.

Atavism is defined, "the recurrence of any peculiarity or disease from which a more or less remote ancestor suffered." Atavistic proclivities from ancestral races are often as unlike as the typic natures of the white, yellow, black, red and other races. The word as used here embraces that instinct, as evidenced in precociousness or delay in the evolution of a person in growth and maturity; or proclivity instinct as a heritage of former times, due to ancestral experiences; or perverse instinct which is by no means uncommon, and often plays an important part in the adaption to environment or to eye experiences.*

*"The Mental Man," Wenzhaff, and other works on Human Nature.

Psychology, or nature of mind, is by no means to be ignored in the practice of Oculo-didactics, because the individual state of mind, including the disposition and the will, often plays a very prominent part in more senses than in the exercise of reason; as evidenced in the fact that imagination is often the most conspicuous manifestation, and it frequently deceives the patient, and thereby tends to mislead the optometrist who is not a master of the situation, and there are many patients who are incapable of conforming their notions to realities.

Psychology, in this connection, is employed to distinguish the rational faculties or energies, powers, and functions of the human faculty of reasoning—or in other words, the phenomena of the mind whenever exercised in connection with conscious concepts, or impressions due to sense preception.

In the originator's work he has had cases where glasses were being worn—some minus and some plus spheres, which did not improve the perceptive vision. When these eyes were tested with regular letters for that work the eyes would indicate 50 to 75%—using 20-20 for 100%, and writing upon a blackboard indicated nothing better. When tested with figures or block designs, the vision would run up to 100% and sometimes up to 120%, thus showing that these amblyopic cases were not due to refractive functions upon the retina, and that lenses were not indicated.

In dealing with those "defective" pupils upon whom faultless teachers failed to succeed in advancing in scholarship, one finds the same principle of energy in the proclivitous disposition to dispose of the percepts and concepts as that of digesting food to fit their peculiar natures.

The mental predispositions of these individuals had much to do with their visual functions. And

when one takes into consideration that the infant represents the combination of parental forces derived from parental sources, so that there can be no two infants alike in size, shape or quality, one sees how impossible it is to take such unlike things and treat them in a like manner and reasonably expect to effect like results. Such efforts are irrational, as evidenced upon every hand in human laws, rules, religions, schools, medical practice, ophthalmology, optometry, or any other procedure which strives to subjugate unlike things to like rules; therefore, it evidences another field of action effecting the most rational results.

The human sensations are impressions made upon the mental faculties through the medium of the sense organs, which consist of those of touch or feeling, smelling, taste and of sight; that of feeling is the most reliable and that of sight is the most unreliable sense organ. The acuteness of these sensations in different individuals varies as widely as do the notes from the strings on a violin, which range from the lowest note on the D string up to the highest note produced from the E string vibration. Hence, the underlying source of discords and defectives, in more senses than one, arise from the conditions of energy which act upon the central senses, and the eyes are not exempt from the volition forces traceable to mental conditions and from which efficient eye-training derives valuable assistance.



OCULO-DIDACTICS IN SCHOOLS.



CHAPTER II.

There is no effect perceivable to or in man but has a first cause which precedes it as a creative force. Then does the education obtained in our schools lead the learner's mind to inquire into the nascent state of nature's conditions of doing? Or, does it skill the sense faculties of students to perceive and learn how to best co-operate with nature in achieving desired results? Do the pupils early cultivate their sense functions, and develop an unbiased skill in tracing things to their genesis in order to find the true starting point for essentials in intellectual attainment regarding natural phenomena?

If pupils were correctly educated to do those things it greatly favors the presentation of scientific consideration of the underlying conditions involved in eye-culture. Because the eye represents generic conditions of family qualities and condition of parental existence. Upon the other hand, if one is not thus skilled it exposes a weak condition for inquiring into the underlying first causes which effect results.

Professional and master practitioners must realize that there is always an underlying creative force from which all phenomena of nature, or of art, proceed, and without which they could not exist.

This inquiry in tracing phenomenon to its genesis is by no means any far fetched theory because there is always an underlying energy, or inherent quality in human phenomena which constitutes an essential element on which efficient professionals must be in-

formed in order to understand a pupil or patron in body, or in mind, or even to understand the normal functions of an organ, and the eye is by no means an exception. Then would a consideration of the genesis of the various conditions from which eyes may have originated be beyond a reasonable limit in this matter of eye-culture. This is asked because the child's eye as an organ is a part of the whole organism and it partakes of the individual's conditions of existence, and is subject to the same laws that control the entire organism.

There are some general principles that are well-nigh universal in regard to human culture and the principles of eye-culture are no exception. It is along those general principles of human phenomena that an efficient professional must begin to survey rather than dive at once into the far-back genesis, or to attempt empiric procedure.

Consider the fact that there have been many eyes, evidently inferior to the average eye, which have been used freely and they developed into excellent eyes because of the conditions of usage. Then, upon the other hand, there have been many other eyes apparently better than the average eye that became deranged and abnormal, instead of developing acuteness, accuracy, ease, freedom, power, and endurance, as the average eye would likely do under reasonable conditions. Why?

It was because they were not properly cared for and exercised according to true didactic principles of culture of the human faculties. If so, then can teachers or specialists reasonably expect to succeed in protecting eyes from injury and bring them forth to betterment by proper procedure unless they begin by informing themselves, and then let reason preside in controlling the conditions and procedure? Is it

not true that unreasonable undertakings must expect to meet with disappointment? Then, can the eye be exempt from the universal laws of existence?

Nature has her own laws of cause and effect to govern all of her products, and human undertakings are successful so far as they combine nature's forces according to her laws so that they act for the purpose. When the combined forces act together in unison the result is harmony, but when they are discordant, their relations are strained and inharmonious.

The eye is but a factor of the whole being and like other organs, it is subject to nature's conditions. The eye is not only responsive to remote discords, but it may have discordant influence upon other organs. Then are professionals exempt from the necessity of working in accordance with the laws of causation which control the success of their procedure, or are they subject to the same laws governing other artisans in achieving desirable results?

In other lines of art efficient operators are obliged to understand the peculiar qualities and nature of the material they have to work with, including their own ability, in order to effect results with reliability. Then in dealing with eyes, is it not well at least, if not essential, to reach back as far as circumstances will admit in order to understand the nature of the being and all the conditions of his makeup, so as to decide intelligently how to treat him according to his individuality and to work in unison with nature?

If the eye is a part of the entire organism, is it not well to understand what is attainable in its development in each individual? In all systematic breeding of animals, it is expected that the off-spring will embrace qualities peculiar to both male and female progenitors. Also, when trainers of animals attempt to

train such offspring, it is considered essential for them to take into consideration the nature and capacity of each individual case as they find it. If so, where does a line of demarkation exempt children from the universal laws of causation in animal organism?

The nature and aptitude of different animals are usually taken into consideration before proceeding to train any of them to a purpose. The procedure is supposed to be ordered according to their nature and aptitude. It is generally considered that a trainer must be at least stupid, if nothing worse, if he does not consider the nature and aptitude of an animal before he attempts to foresee the suitableness of procedure to the requirement. Then where do teachers and professionals who ignore that principle belong?

Upon every hand evidence is complete to show that diversity is a universal principle in all classes of organic formation. Nations have their national characteristics which distinguish each from all others, and it is no less true in each and every individual. Each and every being is an individual phenomenon of those universal forces which cause and control all organic and living things. Every person is connected with the rest of creation and is endowed according to his nature. No two can possibly see, hear, feel, taste, smell, think, act, learn, or grow alike. Then why do not more professionals heed the fact that principles are flexible and eternal? Therefore while eyes are very diverse, methods, rules and tools are instruments to serve man, but not to enslave and subjugate human structure to rule.

There can be no human phenomenon but is unlike all others in some particular, even in eye structure and function. If one will only educate his own eyes to see correctly, and then carefully observe a school room full of pupils, he will find that there are no two

whose eyes are like, or who see alike. The visual images of all the pupils as they look at their teacher do not embrace any two images just alike for several reasons. In this way efficient teachers may obtain a better understanding of the various cases by ingeniously studying the pupil's perceptions carefully in a great variety of ways than can be imparted to them with artificial language.

The real art of true eye-culture admits of the highest degree of scientific and philosophic investigation in order to clearly comprehend and appreciate the true expression in different types, and to master control of forces which effect results and to use them understandingly.

The constituting qualities of human existence are more or less idiosyncratic. This is evidenced in various ways. One of the manifestations is in the odor being so distinguishable as to enable dogs to easily discriminate any one person from all others. And the action of like chemicals upon the flesh of different individuals often effects very unlike results. Also like environments do not have like effects on different persons.

In human makeup there is an inherent energy or force which is distributed to a multiplicity of functions which normally co-operate harmoniously in their activities. There are some instinctive activities which come nearer co-ordinating with human interest than do many of the more popular "scientific practices."

The inherent energy has its own distinguishing quality to as great a degree as does the individual odor, and the distribution is as varied as is the individual physical structure. But there is a general principle of relationship as in the physical makeup which characterizes animal life.

There are the forces of appetite, passion and habit

which characterize animated nature; then there are those of cultured mind and will activities. If appetite or passion or habit becomes the stronger, it tends to enslave the mind and will, to formulate excuses and ways for indulgences of desires. Should cultured mind energy predominate, it influences the will and they proportionally control the other energies. Then the individual classes with those who are guided by their intelligence.

The culture of the eye energies to perceive and discriminate the various phenomena of human forces manifested and the judgment to properly understand them is the key-note in oculo-didactic practice.

Doubtless specialists, parents, teachers and others have noticed some peculiar similarity of children to the peculiarity of some relative. It may be some trait of character, complexion, shape, motion, temper, mouth, nose, ear, chin, hand, foot, hair or the eyes which strikingly resemble the kinsman.

Each child is but a representative phenomenon of the combined energies of parental qualities and it partakes of the ancestry for generations back. Hence an efficient professional realizes how essential it is to so unfold inborn qualities as to sin against none of the essentials, in order to render the most efficient service to pupil, patron and to the world, and this is one of the key-notes in oculo-didactics.

Probably the ancestry of each individual was developed under very different environment from that which now surrounds their offspring, therefore involving very different conditions to be reconciled. In like manner, the eye conditions are no less different than their whole individuality. Hence the different conditions from which eyes have sprung are influential factors to heed. Influences not detrimental to some family qualities may cause results on others which

are repugnant to reason and detrimental to human interest. This is true of all eyes.

Those inborn qualities and capacities constitute the pupils' amplitude or ability to become capable in achievements. The inborn bequest of heredity of a peculiar capacity, or instinct, often indicates original possibilities quite unlike others, hence it is essential to be cautious about subduing hereditary tendencies. It often unnecessarily cripples ability and destroys the possibilities. True, sometimes, according to the rule, it seems necessary to modify certain manifest tendencies in order to conform with assumed requirements. Upon the other hand, the most efficient professionals are cautious and strive to bring forth the original ability to some achievement of value to the world and in no way cripple inherent capacity and power. True those idiosyncratic or ideopathic qualities are often calculated to tax ingenious intelligence in order to meet the conditions of nature, but it is essential to heed them in masterly art, in order to achieve the best results.



OCULO-DIDACTICS IN SCHOOLS.



CHAPTER III.

When a stranger first enters the domain of oculo-didactics he begins a new life, in a new world of beautiful and truthful expressions. He will be perplexed, if not almost stupified, for a time, but will become more and more able to recognize the various expressions, and will gradually learn to discriminate and to know the meanings of the more common expressions, so that by degrees he may become better able to catch the cries and songs of the human eye.

In many abnormal cases, heredity is an etiological factor to consider. Some children are thus foredoomed to permanent abnormality, which calls for mechanical aids, while others may have similar appearances, which have been acquired and can be greatly changed for the better. Generally the hereditary conditions are likely to require much more persistent efforts in treatment or in culture.

The eye, as with other organs, has an individual vitality or life cycle, which prompts endurance to a certain extent. But in all cases, there is certainly a limit to their endurance when abnormally strained, or subject to antagonistic influences, which tend to exhaust.

All deviations from typic or assumed criterion of eye, are generally considered departures which may indicate defect. But it is difficult to describe all the varying symptoms so that they can be clearly per-

ceived and correctly understood. There are conspicuous differences that may be of very little or no importance, and there are indications much less in evidence to the ordinary observer which show serious conditions. Often many of the latter are overlooked or are misinterpreted by the average professional. Then, again, if there was an undertaking to contribute a full description of the various conditions found in schools, there are those who would attempt to prescribe pet remedies or follow favorite procedures, and thus cause serious results.

There is not a phase of physical or of mental condition which is not expressed in the most truthful way. It is not always in smiles, groans, or loud words, or in any form of artificial designs, or with any premeditated intent. It is in a language far more beautiful and truthful. Therefore it is more interesting and reliable when correctly understood.

There is no peculiarity in eyes perceivable to man but has a first cause which precedes it as a creative force, and there is no phenomenon of the eye but corresponds with the conditions of causation. Consequently, inherent qualities and the conditions of experience may constitute some of the essential elements on which one must be alert in order correctly to understand his subject in mind, body or eye. But any attempt to set forth the various conditions from which an eye may spring would carry the subject beyond reasonable limit. Nevertheless they are all factors in a child's make-up as a whole. Any professional who cannot correctly interpret the language of symptoms must be proportionately at sea, without chart or compass.

Sense-faculties vary widely. Some are quick and acute in response to a given amount of stimulus,

while others cannot be induced so to respond without more stimulus and some are incapable of such activity.

When children's eyes are permitted gradually to unfold under reasonably favorable conditions, they will more likely develop into good normal eyes, than would be the case when they are ill-affected by unfavorable influences and abuses. To say nothing of the inherent diversity, there must be very different consequences to follow the diverse influence and habitual actions of different children. The transition of childhood to maturity does not always develop equally in all respects, but efficient optometrists and teachers should understand the art of attracting children's attention and exciting a desire to inspect. Then, under proper guidance, the ability of children to observe and to concentrate attention to details increases. It improves the ability for research and leads on toward the highway to superiority in some achievement. One child may have a quick, acute sight and ability to use the eyes in weak light, and another one's eyes cannot respond to the will and see without more light. One child may maintain active use of his eyes with pleasure, and another not be able to use his eyes with any delight, and only in a limited degree, without becoming fatigued. Then the discriminative faculty of children ranges widely, so it requires ability to guide them properly. An increase in ability to see and a growth in power to identify differences enables one to acquire more delicate and acute power of distinguishing qualities and keenness in seeing.

Many children hold their attention in a spasmodic, fleeting, momentary manner for immediate requirements only. Therefore it requires constant attraction to hold the attention of such children. Bright lights,

vivid colors, striking forms, curious designs and surprises are excellent means to induce attention in observation. An excellent plan is to keep a variety of objects out of sight until they are brought into direct use in some unlooked-for manner, to surprise and awaken desire and curiosity.

The younger a child when one commences properly to drill sense percept, the more favorable for attaining the highest degree of excellent results. But it is essential to heed the fact that a child first sees very little and for a time growth is slow and cannot be forced to good advantage, for in doing so, it may confuse, perplex and effect a sense of dislike.

The fundamental capabilities of a child and the idiosyncratic peculiarities in instinct are individual qualities that must be influential factors. But the increase in instinct, in egotistic feeling and habits are also factors to be heeded, because children are strongly disposed to measure things by their earlier impressions, even back to those made in infancy. As one advances there is more tendency to invoke intellectual activity and to note differences, but there usually remains for some time a strong inclination to copy or merely try to remember without attempting to reduce to logical reason. There has not been any due consideration of the importance of any proper exercise of the psychic facts which play a part in relation to subsequent images, therefore much depends upon primary discipline of the sense faculty. At first children have small acquisition of concepts or visual images, calculated to aid them in understanding. But one can induce repeated efforts in looking at things and in this way the power to see becomes more and more developed by degrees.

Many children are unable to look at objects and form any clear images of them. Some children may

be able to obtain a crude partial image and later may notice other things and begin to combine them and form very distorted images. By repeated efforts a child will improve its powers in seeing size, shape, color, motion, distance, and direction, and a general image of what its eyes survey. But when it attempts to describe the things, there will appear the former mental creation, which, if properly considered, reveals the visual as well as the mental condition.

Constant practice in describing just what one sees will improve one in accuracy, and suitable culture will enable him to obtain a more correct image of objects observed. Hence the primary sense culture is the fundamental source of correct mental and visual creation.

The visual faculty answers the inquiries pertaining to objects observed according to the accuracy of optical images, and the correctness in the mental interpretation of the percepts. Therefore incorrect sight of things tends to confusion in mind and in operation.

Positive results follow reiterated exercises but those exercises may influence toward the desirable, or toward the objectionable, so that either benefit or harm may result. The old saying that exercise cannot do harm, even if it does no good, is an unsafe axiom, as is evidenced by results of present ill-advised eye exercise in our schools. It is true that through action the muscular fiber is developed in power and endurance, and elasticity increased; as in the whole body there is a chemical change, but there is a limit and a suitableness to this development and change. While a strong healthy, robust child can endure much abuse or beneficial activity, one of chlorotic tendency and general lassitude, must have more moderate exercise. Fatiguing movements for fatigued muscles of chlor-

otics is absurd. Exercises are to **stimulate** and **develop**, not **exhaust**, and it is more essential to have them suitable than lengthy and frequent. Proper activity will stimulate the nervous system and muscular action, increase circulation and thus effect change in sensation and assimilation, but operators must always bear in mind that a stated description of exercise may be fitted for a healthy, vigorous boy and be harmful to a weak girl, therefore professional skill is necessary in order to guide a parent or teacher as to a child's interest.

Suitable exercises in eye culture are based upon well known physiological laws. Therefore, the application in different cases depends upon the pupil and the understanding of the operator. The directions contained in oculo-didactic procedures to follow, are conservative and designed for general use by those of normal conditions. Deranged cases require special action and may not yield as readily, therefore, want of perseverance may lead to failure when continued efforts would insure excellent results.

It is important to impress the need of general exercise, cleanliness, pure air, sunshine, and sleep as of vital importance for health of body, mind and eye. Refrain from dwelling upon diseases in your examination and exercises, as it often tends to excite morbidly sensitive natures. A resourceful professional can do much in showing the joy and ennobling results from accurate and acute sight, and how it leads to truthfulness in observation and thought, so that those who learn to see best have many advantages over those with ordinary sight.



OCULO-DIDACTICS IN GENERAL PRACTICE.



CHAPTER IV.

In oculo-didactics as well as in other professional work, the narrower the operator's survey and perception of Nature's universal principles, the more finite and narrow will be his conclusions and his skill will be proportionally limited. The broader one's survey, the more favorable for evolving the ingenious ability of men to meet the diverse conditions to be dealt with in the problem.

Under such conditions it seems to be necessary, in some manner, to arrange a background against which to portray the distinguishing features that chance to be evidenced in these various unfamiliar considerations. This because the human mind is incapable of distinguishing unfamiliar matter only by comparisons.

As an assumed background to illustrate, let us refer to the typic ophthalmologic "normal," or complete eye, which is defined as: "That state of an eye in which, when accommodation is suspended, parallel rays of light are brought to a focus upon the retina." This expression, "when accommodation is suspended," means a paralyzed condition of eyes obtained by the use of drugs. Under this condition, the eye, in order to be "normal," must be able to distinguish objects which "subtend an angle of five minutes," or in other words, twenty twentieths vision as per Snellen's test type. Optometry is "The Science of measuring the optical state of the eye." In statutory

provisions, optometry is defined as "the employment of any means, other than the use of drugs, for the measurement of the powers of vision and the adaption of lenses for the aid thereof." In Optometry, "normal" is that state of eyes, "which conforms to the natural rule," so that when in a state of rest or repose, without drugs, the eye is able to see twenty twentieths. Is it not self-evident that these two requirements are not in unison with any one criterion? Then which of the two is the most sane and most in unison with Nature? One, at least, if not both, must be more or less questionable; therefore, it may suggest the query as to whether either of these embrace a true unison with Nature's conditions of a complete eye? Then is there an opportunity for another criterion that is more in unison with complete organic structure? If so, is it not our duty as professionals to know? And again, is it not the duty of each generation to progress and to improve upon the past, where improvement is possible? According to oculo-didactics, completeness depends upon co-ordination of all parts; therefore, "the eye can be complete only so far as all parts and powers have a full legitimate and harmonious action." Oculo-didactics purpose to equipoise and co-ordinate all discordant relations of parts and powers pertaining to the eye—especially the muscular complications. This line of procedure has led to a conclusion that there is no natural state of human muscular condition where activity is ever suspended as evidenced in a so-called paralyzed condition of eye by the use of atropine.

From birth eyes have their own inherent natures and proclivities, so, that some strongly adhere to hereditary tendencies, while others readily yield to diverse experiences, whether they are beneficial or detrimental. To greater or lesser extent, the mental

force, nerve tone and will energy control the muscular action according to the nature of the peculiar state of the individual, but the psychic energy and motor force vary much in activity, and the sensor acuteness of individuals varies widely as does also the diverse physical amplitude in power and suppleness. While there are certain characteristics of eye structure that can be given in a generalized description much as in describing the human form, the details of vision can no more be set forth according to pattern or rule than words can set forth diverse facial expressions by rule.

Yet we do not want our readers to in any way infer that this problem and optometry are divorced from each other, for optometric science has a wide range of under-lying factors involved and it is for skilled professionals to interpret as to whether the discordant eye conditions are to be equiposed by suitable activities, or by adequate glasses, or by both training and glasses. These efforts have values in proportion to the benefits they confer. There are often several conditions to be considered which play a part so that completeness depends upon the skill to co-ordinate the parts, by various means.

Glass fitting is a popular theme in optometry and ophthalmology and it admits of various theories, and all operators are at liberty to resort to any of the various methods for measuring the eye, but the purposes and the interpretations of measurements are often at variance. The characteristic difference in optometric oculo-didactic glass fitting consists in acting **directly** upon the discord or strained parts, and to employ the least power of lens that is consistent, so as to enable as great a range of natural activity as is reasonable; or in other words, a minimum fitting instead of the maximum, which subjugates the eyes to the oculist's pattern or the optometrist's mechani-

cal rule. Hence, oculo-didactics taxes the ingenuity of the operator more than any other plan.

It matters not how "high" the "authority," or "classic" the "education" from which rule guidance is derived, it never embraces the true principles of natural vitality. But do not understand that one is to rebuke anything that is worthy of sane consideration. We simply protest against so much brainless servitude without any attempt to understand the universal principles involved, which vitalize and nourish the intellectual understanding.

In regard to true professional efficiency in oculo-didactic science, it is necessary to scientifically and philosophically reach conclusions and then devise ways and means for guiding dependent patients. In order to do this understandingly, one must be able to distinguish the inherent conditions from acquired results, as well as to differentiate between realities and inferences and be able to recognize the forces of nature without being hampered by theory, pattern or rule dictation. Hence, it is well, at least, to keep in mind the universal principles of Nature, among which is that cardinal truth that the eyes see only what they have been educated by experience to see, and that the specialist's eyes are not exempt—especially in optometric practice. It is essentially necessary for a specialist in optometric science to at least try very hard to see things and strive to see the whole being of a patient; also strive to correctly interpret all the various conditions in regard to the alacrity of mental action and of the physical motions, for these are often reliable factors that can be made helpful in deciding upon procedures.

There is an enormous amount of eye-strain suffering upon every hand, and much of it is preventable to a greater or less extent, by suitable training

to be heeded at home and in schools, as well as elsewhere; therefore, decide if it is not next to family duties, a civic duty of every citizen, whether a teacher, or an eye specialist, to promote any and all real benefits to society as a whole. In fact, does not the real value of any citizen, profession or public effort consist in their value to man—and on the other hand, any person, profession or public effort which tends to injure human interest, merits condemnation and elimination, and it is no less true in optometric service.

Evidence of a necessity for man to learn to see more is manifested in various conditions of human eyes to be met with, and which have not been recognized in ophthalmology, or rule optometry. Among which is that subnormal refractive power in many children's eyes due to immature conditions of childhood, and naturally outgrown during the developmental period. While such an eye evidences a subnormal refraction, there is quite a difference between hypermetropia due to short eyeball, which is not generally outgrown, and that childhood state which is usually outgrown; but how many optometric specialists have learned to readily see and to discriminate between hypermetropia and **aoropia**. Then there are various asynergic eyestrains which cause much more far-reaching reflexes than has been generally understood, furnishing a broad field for practical skill in oculo-didactics, combined with the art of skillful glass fitting not practiced in ophthalmology, or optometry in the past. Discordant or non-rhythmical association of parts or of powers effect consequent results are often far-reaching in effects, notwithstanding they have not been **seen**, or recognized in ophthalmology or optometry.

The training thus far obtained in special schools

does not lead inquiring minds to independent research for unbiased problems, or to develop skill in tracing human phenomena to the genesis for reliable data upon which to base knowledge. These are stern facts which expose the weak conditions of the college-bred professionals for unfolding unbiased inquiring minds necessarily required for efficient specialism in optometric oculo-didactics. It is because it is vitally essential to deal directly with Nature according to her own laws of each individual case. For something of an analogous comparison in regard to independent skill, let us refer to a high grade specialist in watch repairing: Does he, upon receiving a delicate watch to repair, study it carefully and duly consider the special construction, then inspect all the relations of parts to detect any discordant relationship which tends to cause friction, or sway the true ratio of all its parts so as to disturb the harmonious relationship of action to time? or, would he recall bookish rules and authority, for procedure?—instead of resorting to his own ingenious intelligence and skill in trying to correct the defective parts, so as to co-ordinate all parts in order to effect the most skillfully complete result? Repeated efforts aid one to become more and more familiar and skilled, so as to readily detect discordant relationship of parts, and thus become better prepared to co-ordinate and reconcile all parts with the complete whole.

It is no less true in regard to efficient skill pertaining to the human eye, for the eye is but a part of the whole structure; and it matters but little what portion of the entire field of human organism man attempts to reconcile and co-ordinate with the whole structure, he must certainly recognize Nature's conditions in each organism, and duly consider that any and all art considerations are minor accessories which

play some subordinate part to serve the operator. Hence, efficiency in complying with Nature's conditions in attaining results requires more than familiar skill in memorizing books, rules or precepts.

Nature's forces operate silently, actively and ceaselessly, in carrying forward her orderly process of the whole organism, and efficient specialists in optometric oculo-didactics must, in order to become masters of the work, be able to co-operate harmoniously with Nature's conditions in carrying forward this process. If we had been more suitably trained in tracing realities and in recognizing ideal "truths" for just what they are, in fact, there would be more of us who would readily recognize that Nature's unbound volume is the more valuable library to ransack in order to become more masterful in optometric work. Nature's laws are not barren ideal theories for rule-mongers to prattle about the patterns, rules or precepts, but are realities of efficient forces which are the most useful agents employed in optometric science.

The author is not unconscious of the prevailing demand for exact detailed instruction and rules as to procedure in Oculo-didactics. In view of this and in answer to numerous inquiries from those who aspire to professional Oculo-didactics, as to whether there really is a "field" for such work, in connection with the practice, we will briefly survey the author's efforts in his private practice. There is most certainly an ample opportunity for such special work and an increasing demand for such service, because of the scarcity of aspirants with unbiased dispositions and suitable educations to grasp it readily; therefore, this professional specialty will not be over-run with efficient masters for considerable time to come. But efficiency cannot be attained by any hop-

skip-and-jump course through any of the medical or optometric schools as they now stand.

Early experience of the author in private practice, exposed the necessity of resorting to some other way than that usually followed in regard to familiar matter in order to convey a correct understanding of the new problem. Among the various efforts, the most successful one has been to personally call upon the leading physicians and educators, and explain the basic principles of the system and then to prove them, or expose falsity by having it tested in difficult cases upon which other professionals have not succeeded in rendering satisfactory service. Others were approached in like manner, and in this way more or less test cases were usually found upon which efforts were made.

In general dealing with prospective patients, they are frankly asked which system of eye work they desire. This often leads to a consideration of the facts which characterize the four distinct systems of procedures with eyes, pertaining to sight, independent of pathological complications for medical interference; the characteristic facts pertaining to the oculist, the optician, the rule optometrist, and the didactic optometrist.

If a prospective patient prefers the oculist's skill to fit the eyes with glasses, he is frankly informed that we confine our efforts in that field of work, to optometric science, independent of any medical treatment or use of drugs or subjugation of eye to pattern or rule. If he manifests a desire to know "how cheap can he get a pair of glasses," he is referred to the optician or stores where they sell glasses. If he wishes to know what it will cost to have his eyes fitted with glasses he is informed that it depends upon what is to go with the glasses, together with the quality

and style. If he expresses a desire to have glasses fitted, attention is called to the question whether it is to simply aid vision as usually fitted by the rule optometrist, and then rely upon the glasses for effect? In that case it will cost but little for services and the price of glasses, which vary in quality and style of lenses as well as in the mounting, which he may see fit to order.

When patients inquire regarding Oculo-didactics, they are informed that the charges depend upon what the services may probably be worth in fact, providing they do their part. Usually it ranges from five dollars upward, if the patient does his duty to himself in the efforts to train the eyes as suggested. The exceptions depend upon circumstances, for in some cases where worthy individuals were in serious need of assistance and could not pay for the services and glasses, they have been furnished free. With those who are amply able to pay, an estimate of the real value of the service is given at ten, twenty-five, fifty or one hundred dollars, according to the work and time required.

This procedure has been sufficiently encouraging so that on Jan. 1st, 1900, a system was adopted for taking the signature and address of each patient upon a blank, from which the record of each case was entered in a book, and numbered in rotation, commencing with number one; and in ten years from that date, the number had reached to 33359. The most encouraging feature was in the grade of the patients' recognized intelligence by their professional employment, which challenges the world for its equal in the percentage of that class of patients in any general practice of optometry or ophthalmology. As to the per cent of those who evidenced preference to didactic optometry, the operator's opinion is that it is not less

than 75 or 80 per cent of the entire list. The most unsatisfactory feature met with, was in regard to the number of those who neglected to persist in the training, and the abrupt discontinuance in the use of treatment glasses before it was to their best interests. Therefore, it became evident that it was very necessary to strongly urge patients of the real need of giving Nature sufficient time to effect results by growth which requires time and activity.

Since January, 1910, the operator has abandoned much of his former activity on account of age and has taken more time to urge continuity of effort in training eyes. This has proven beneficial to those patients who heartily and intelligently carry out instructions. In addition to the foregoing undertaking, the original exponent of this eye training did much work in educational institutions from universities to primary schools, and furnished many "Visual Test Reports" to indicate eye conditions.

In this connection, it might be well to briefly present a number of cases which have come under the author's care and observation in his private work showing results in Oculo-didactics practice, some of which were most intelligently handled by the methods in vogue in optometry and ophthalmology, without satisfactory results.



THE LIBRARY OF THE
U.S. ARMY SCHOOL OF OPTOMETRY
390 W. HENNINGSEN BUILD.
LOS ANGELES 7, CALIF.

. 0555

OCULO-DIDACTICS IN GENERAL PRACTICE.



CHAPTER V.

Case 1.

A woman met with an accident in which she received a severe stroke upon the side of her head, after which she "saw double." She came under Oculo-didactic training, wearing a compound lens for one eye and an opaque, ground lens for the other, fitted by the "best oculists." The opaque lens was removed, both eyes fitted according to the refractive errors, and Oculo-didactic training begun; after her third treatment she was able to see with co-ordinate fellowship of eyes.

The oculo-didactic procedure in this case consisted in removing the opaque lens from before the left eye, which turned upward 30 degrees, then pressing a wad of cotton over the right eye and fixing the gaze with the left eye upon an object. She was instructed to concentrate with all of her ability, then slowly move the head backward as far as possible and still see the object, and repeat until the eye became tired. The eye was then given a rest for a time, after which the former exercises were repeated. The patient was instructed to apply hot water compresses for ten minutes before retiring and in the morning before coming to the office. A similar exercise to that given the day before was practiced the following day, and the eye began to manifest improvement. The patient was instructed to repeat the exercises for a few days and then call again. At the third call the exercise was similar, other than in commencing with the head tilted well forward with a firm pressure over the

right eye. This was repeated until there was a sense of fatigue. Diplopia had disappeared and a test survey indicated unison after this third treatment.

In reviewing this particular case attention is called to the use of hot water. For thirty years or more the author has been making use of hot compresses in connection with muscular discords. After taking a survey of eye conditions, hot compresses should be used for ten minutes. We lay particular stress upon **ten minutes**, because up to that length of time the heat tends to relax and to quiet. If continued too long, it becomes an astringent. Have an alcohol lamp device at hand to resort to when necessary, and a supply of cloths. Make frequent changes so as to keep the eyes **continuously hot**. While it acts as an anti-spasmodic it is in no sense a mydriasis.

In some of the difficult cases the eye conditions **after** using hot compresses, are very different from those indicated before resorting to the heat. Where the eyes become uncomfortable from glasses antagonizing eye-habit, the application of hot compresses often tends to relieve such discomfort.

In general care of the eyes when hot water is resorted to at night upon retiring, make free use of cold water to the eyes and back of neck in the morning.

Case 2.

A traveling railroad passenger agent was a nervous wreck and an inveterate user of tobacco. Oculo-didactics restored his nerves and broke him of the tobacco habit.

The patient's left eye turned upward and outward. Both eyes were hyperopic with some irregular astigmatism. He was fitted with compound lenses to co-ordinate, and instructed in suitable movement exercises as indicated on the Oculo-didactic chart, to de-

velop the insufficient muscles. The result was relief from that nerve irritation which disturbed the stomach function.

Case 3.

The president of a normal college could not distinguish movements of one's fingers five feet away, with his right eye. He had been told from childhood that nothing could be done with that eye. After twenty-four months of Oculodidactic training, vision in that eye scaled fifteen twentieths, and glasses for distant vision were discarded.

The ophthalmoscopic examination did not reveal any abnormality, and by exercising, the eye soon revealed a tendency to improve. Placing a bright red lens over the right eye to stimulate, and a deep blue over the left eye, revealed that the eyes did not co-ordinate. Inferring that the amblyopic state was largely due to suppression of eye function to relieve the strained relation of the two eyes, the patient was urged to practice closing the left eye and forcibly concentrate his mind and will in trying to see with the right. Favorable results were soon manifested, and in one year the improvement in acuteness was much greater than expected. In two years vision was about normal.

Case 4.

A traveling salesman had taken the Hage and Keeley cures for alcoholism without success. A reduction from his old lenses, an addition of certain prisms and Oculodidactic training relieved his craving for strong drink within 60 days.

The patient's left eye turned out and up so that at times a skilled observer could detect it. He was sent to a barber to have hot wet compresses applied and changed often for ten minutes. The eyes were then fitted with the minimum power that seemed consist-

ent, and the muscular discord modified by using a prism, base in and down. This gave him relief from the start.

In connection with the above, the patient was instructed to train the eyes according to the oculo-didactic system, as outlined in suggestions to follow.

Case 5.

A postmaster couldn't read names on boxes above a vertical line of vision. By the Oculo-didactic System he was made to read at any angle with perfect ease.

This case was due to insufficiency of one superior rectus, thus offsetting in the upward turn so as to separate the image from slight to two distinct images, although there was no evidence of muscular imbalance by the ordinary horizontal line tests. It was only when the line of vision was deviated upward, well above the 180th meridian that the discord manifested itself. By using low power prisms and training the eyes this can usually be overcome, independent of glasses.

Case 6.

Several oculists of note failed to benefit a school girl afflicted with migraine. She was wearing plus lenses. Suitable Oculo-didactic training relieved her of the headaches and enabled her to discard the glasses.

This patient had hyperopic error, but less than the glasses indicated. The main trouble was a rigidity of the superior of one eye and inferior rectus muscle of the other eye. This muscular strain and distress soon disappeared and under oculo-didactic training, as indicated in Rules 4, 5 and 7, glasses were discarded.

Case 7.

A stutterer, whose eyes had been pronounced "O. K." came under Oculo-didactic treatment, was fitted with tem-

porary glasses, which with suitable Oculo-didactic training enabled her to articulate without stuttering. After twelve months Oculo-didactic training, she discontinued the glasses and was permanently relieved of her impediment.

While the vision of each eye was pronounced "O. K.", there was a hypersensitive spasmodic tension of one of the superior recti muscles, which was relieved by resorting to a weak prism, and the muscle improved in function by oculo-didactic training. The vocal functions eventually became normal. The training in this case was along the line indicated in general Oculo-didactic Rules 1 to 10.

Case 8.

A medical doctor tried many "regular" practitioners. His distance correction was in accord with optometric findings and the usual muscle tests showed no discord. Prism segments were prescribed and Oculo-didactic training begun. In one year he discarded the segments and had no further trouble.

The discord in this case was evidenced when reading. When the eyes were put to a continued test in that function they revealed an insufficient endurance of one inferior rectus, which was relieved by prism segments. By suitable training the muscle was developed to perform its function continuously, and the segments discarded.

Case 9.

A woman teacher became a nervous wreck and was sent to the state hospital for the insane, after oculists and "rule" optometrists had pronounced her eyes "all right." Oculo-didactic training relieved certain eye strain and enabled her to resume teaching.

Was due to discordant relationship of the ocular muscles and hyper-nervous tension; and by the use of prisms to relieve and training to develop functional

activity, the nervous disturbance soon disappeared. Exercises 4 to 10 were employed in this case.

Case 10.

In a village school were two cousins, both wearing $+ .75$ lenses prescribed by an oculist who pronounced their eyes to be "exactly alike," and called "hyperopia." According to Oculo-didactics, they were both cases of Aoropia, and glasses were unnecessary beyond the temporary use of very weak lenses at times when studying. One of the boys chose Oculo-didactics; the other decided to "stick to his glasses," as he put it. Some three years later, both boys appeared at a Teachers' Institute. The Oculo-didactic boy had excellent eyes in every respect. He had not used his glasses except during the school year when they were fitted. The other boy was wearing $+ 1.25$, fitted by the same oculist who fitted the first lenses to the two boys.

These cases were tested in the usual way, but they appeared rather immature for their ages. The accommodation was tested with minus lenses and evidenced a reserve range of ciliary action; therefore the insufficiency was in the endurance of accommodation due to immaturity, and would naturally be outgrown as the subjects matured in development.



OCULO-DIDACTICS IN GENERAL PRACTICE.



CHAPTER VI.

To indicate something as to the possible range wherein Oculo-didactics can at times be made a factor in results, a brief reference to some of the abnormal conditions follow; several of these conditions are often found in combination and thus become more or less complicated as to the oculo-didactic bearings, but the universal principles remain the same.

Amblyopia or dimness of vision, may be congenital or due to organic disease of eye, or acquired by toxic effects of drugs, such as quinine. This condition is seldom much influenced by resorting to oculo-didactics, but there are cases in which the eyes are affected from alcoholic stimulants, tobacco, or non-use, when by co-ordinating such eyes with lenses combined with suitable training, vision may be partially or wholly restored.

Toxic amblyopia calls for a discontinuance of the drug causing the effect, and if not too far advanced, suitable training may restore more or less vision.

Asthenopia may be due to the physical condition of the being, discordant state of the ocular muscles, or to errors of refraction. In many cases suitable muscular exercises give relief. The eye is a part of the entire being and cannot be strong and efficient when the body is feeble; therefore, it is dependent upon the physical condition. Overtaxation demands rest to reinstate normal vitality, followed by suitable

exercise to develop muscular power and endurance, so as to be better prepared to perform its functions.

Aoropia (a-o-ro'-pia): This condition of subnormal refraction due to immaturity, will usually, under ordinary experiences, be outgrown during the formative period, and seldom requires any aid, other than reasonable care and suitable use.

For many years the author has noticed numerous cases of so-called "Hypermetropia" in children's eyes, due to immature or undeveloped conditions, which he considers are naturally outgrown as a child matures. Hypermetropia is said to be the result of abnormal eyeball. The author ventures to depart from the popular view and to class such refraction of children's eyes as "Aoropia," to signify an undeveloped state of refraction which will naturally become typic under oculo-didactic training, and often under ordinary conditions of normal development.

Aoropia so closely resembles the refraction which characterizes Hypermetropia that writers have persistently classed it as the latter. Valk says: "All eyes are born hyperopic." Ely says: "Nearly all children have short eyeballs." Other authorities declare that a very small number of infants have normal eyes. Valk goes on to say: "I think I have shown in my remarks upon the emmetropic eye that this flat formation—or hypermetropia is congenital." While the author concedes these physiological facts, he takes the position that under reasonable conditions, the eyes of infants are not exempt from the general law of physical development, and that under proper conditions a large majority of these, if not all, become normal at maturity. The condition is admittedly largely due to lack of development, hence we are inclined to the view that this insufficiency in refrac-

tion is due to immature condition rather than to abnormally proportioned eyeballs, and we base this opinion upon the fact that we have examined, watched, and cared for the eyes of many thousands of children through the Aoropic developmental period. Aoropia may often be a factor combined with other conditions, so as to tend to indicate a temporary need for glasses; therefore good judgment should be used as to procedure in fitting of temporary glasses, and training.

Astigmatism, when due to inequality of curvature of the different meridians of the cornea, termed corneal astigmatism, may be greatly benefited by oculo-didactics. Astigmatic conditions caused by irregular muscular action which distorts the lens, classed as lenticular, may also be benefited.

A gentle pressure upon the lid of a closed eye while rotating the other eye, tends to modify an irregular surface of the cornea of the eye pressed upon. Daily repetition of such practice will in time effect a manifest decrease of the astigmatic condition. Suitable prism lenses and muscular exercises may reduce many cases of lenticular astigmatism. Almost invariably oculo-didactics will reduce the degree of corneal astigmatism.

Asynergy, or faulty co-ordination of parts, or muscles normally acting in unison, may impose extra tax upon some part of the eye so as to cause slight or serious effects. Here the best skill of the optometrist is required to secure harmony and relief. Oculo-didactics has been resorted to in many such cases with beneficial results.

Copiopia, or eye fatigue, may be due to excessive use of eyes, or muscular rigidity, or the physical con-

dition. Such cases may call for pathological consideration, and skilled adjustment of glasses. Rest is essential before oculo-didactic exercises. Excessive rigidity of muscles may not give rise to any manifest local discomfort, but is liable to lead to fatigue when it involves the eye function. Cramped or rigid muscles can usually be relieved by the application of hot water for some ten minutes, previous to examination. Suitable muscular training is often beneficial.

Diplopia is frequently due to a muscular imbalance which deranges the relationship of the two eyes. Oculo-didactic training is often serviceable.

Ophthalmalgia. There are various kinds of neuro-pains, such as anemic, malarial, gouty, rheumatic, syphilitic, diabetic, toxic, hysteric, and reflex. Sometimes, when the intercostal nerve is associated so as to disturb the visual function, a brisk rubbing of the face and forehead, and rotary exercise of eyes, as indicated in general oculo-didactic training to follow, to stimulate circulation, can be beneficially employed.

Myopia. Excessive refraction may be due to an abnormally long antero-posterior diameter of the globe, whereby the focal image is formed in front of the retina. It is so described in ophthalmology and optometry. Oculo-didactics teaches that, to some extent, myopia is an over-developed refractive power brought about by excessive use of eyes at short range, causing myotonia tension and myopic state. Oculo-didactics will prevent this in many cases.

There are cases on record where suitable oculo-didactic exercises, something like those in general oculo-didactic rules, 1 and 2, to follow, have greatly reduced high degrees of myopia. A professor in the State University of South Dakota, was wearing a — 6.50 — 2.00 ax. 180 O. U., fitted under mydriasis. The

vision, with this correction, when the patient first came under the author's observation, was 20/30 or 65% normal vision. This correction was gradually reduced over a period of years until his correction was — 2.00 with a — 1.00 cylinder with vision 20/15, an average of 135%. The eyes were much more comfortable than formerly, and all this was accomplished after the age of thirty-eight, which would naturally make results slower in effect. In brief, this case showed an improvement in acuity of vision as 65% to 135%, to say nothing of the comfort. While this is an exceptional case, it serves to illustrate the range that is possible in some cases.



OCULO-DIDACTIC PROCEDURES.



CHAPTER VII.

There are numerous "errors" and combinations which in some way, more or less involve muscular fibre and nerve energy of eyes. In a large per cent of muscular fibre complications, Oculo-didactics can be made more or less **serviceable** in **attaining beneficial results**. Perhaps the heterophoric class is the most favorable from which to draw a clear illustration of the principle of applying Oculo-didactics, because professionals are more familiar with extrinsic muscle insufficiencies. As to the mode of procedure in the Heterophorias, suppose the eyes are exophoric; this would indicate a spasmodic state of the external, or an insufficiency of the internal rectus muscle. Then comes the question as to the physical ability and the potential energy of eye structure.

Asthenopia or fatigued state, would indicate a palliative course with lenses to mechanically relieve the muscular strain, and thus aid Nature in restoring the natural tonus of muscular structure. The period of rest will depend much upon the individual's state of vitality, the amount to overcome, and experience. Oculo-didactic training, which in this case would in part consist in closing one eye and with the other, fix the line of sight upon any piece of **printed** matter held directly in front of the eye, with a firm resolve to read it **correctly** and as rapidly as possible. Move the print toward the nose in line of the weak muscle, so as to contract the muscular

fibres. Then proceed to rotate the print as indicated on the Oculo-didactic chart, around to the starting point. Commence again and turn the eye inward as far as possible and then rotate as before, only in the reverse direction. Repeat over one way and back the other from three to five times, then change to the other eye and proceed in like manner.

Thus any of the ocular muscles can be exercised and by daily practice for a few moments each morning while the eyes are free from weariness, there will surely follow results. But, it is a **growth** and **cannot** be accomplished all at once.

Now, what can be effected by such an exercise? First, the eye that is open and rotated is moved by the exercise of the ocular muscles and thereby increases flexibility and amplitude of the muscles and thus benefits the insufficient muscle. It also tends to decrease the general muscular rigidity, distress and fatigue, which is more prevalent than generally understood.

The gentle pressure on the lid of the closed eye will increase the friction of the globe in the orbit. As the open eye moves it requires more nerve energy and muscular power to overcome the resistance, and thereby increases the power of action. It also tends to equipoise corneal curvature and thus decrease the astigmatic tendency. In some cases it has produced very marked results.

In this exercise, attention is called to the use of printed matter, simply because it brings out the action of mind and will, demanded to read it correctly and rapidly. In all successful training one must energetically exercise **mental purpose**, **will energy** and **muscular action**.

Along this principle of acting upon muscle fibres

an efficient specialist can readily devise some suitable procedure to train any desired part of the muscular structure; but in ordinary training, the Oculo-didactic Charts to be shown later, are convenient, as the patient can more readily understand in just which direction to rotate from the center to exercise various muscles, and how to direct the movements as he reads the letters and figures. The Charts are especially useful in training the eyes of children.

To aid the less thoughtful in arriving at an understanding of Didactics as applied in eye training, the general exercises are submitted. These are primarily intended for eyes of normal tendency, with no manifest defects, but may be used to advantage in connection with special exercises by omitting or regulating the movements that tend to overtax the weaker parts.

In referring to Oculo-didactics for consideration in optometric practice, the operator must consider the fact that there is no one line of procedure which embraces every case. It is a universal principle that no matter how valuable any one agent or mode of procedure may be, it becomes a fad, and at times dangerous, when blindly employed to the exclusion of all other health adjuncts, and this is evidenced in the tendency of ophthalmologists to use drugs or the knife—or of optometrists to use lenses, without a full survey of fundamental principles and conditions involved in individual cases.

Among symptoms which should be observed by the Oculo-didactic specialist—symptoms which point to the need of special training, even tho' the eyes may be found entirely emmetropic, and not usually considered when looking for refractive errors are:

A wavering and unsteady gaze.

Turning the head sidewise when fixing the gaze.

Tendency to close one eye.

—5

Muscular contraction of facial muscles when looking.

One side of the face higher than the other.

One side of the face farther forward than the other.

General manifest lack of interest when looking at objects.

General aversion to study.

Watering of the eyes.

Drowsiness.

Nervousness.

Digestive disturbance when taxing the eyes.

Unreasonable dislike to certain persons or things.

Elevated eyebrows with expressionless face.

Failure of upper lids to follow eyeballs in looking down.

Another important factor that can often be traced to primary experiences is a tendency of individuals to hesitate in a state of tension. In every muscular action there are two sets of muscles exercised; one, the positive or propelling muscles—the other the negative or antagonistic, to modify or govern; and when there is a state of hesitancy in action, there is usually an overtension on the secondary or modifying muscles which tend to rigidity and strained relationship of the eye muscles. It has been the practice of the author to have each patient write his name. Here this muscular rigidity will quickly manifest itself in the cramped fingers and hand. This rigidity and muscular discord are evidenced in many cases of eye strain, where otherwise the eyes are in excellent condition and without refractive error.

Every varying mood of thought or of feeling has an influence upon the whole being and the complicated apparatus formed by the nerves and muscles of the

eyes, cause many times more serious eye strain than all ordinary errors of refraction which can derange the vision. This being true, one can better estimate the benefit to be derived from Oculo-didactics or suitable training when conducted under the supervision of a competent Oculo-didactic specialist.

The movement exercises, like those in a gymnasium for physical culture are for securing freedom and power of muscular action, and nerve activity as well as for increasing circulation and endurance.

Owing to pathological conditions, especially when any part of the eye is over-taxed, or fatigued, there needs to be discretion exercised, but when there is a source of energy, lack of activity, or insufficiency due to indolence, activities are a source of growth, power and endurance. Hence much depends upon the nature of the individual. Strong, robust, healthy persons can be handled much more energetically than can feeble neurotic individuals.

In animal organism, there is an inherent predisposition to restlessness, hence action and those activities independent of mind and will are the involuntary ones upon which existence depends. Those activities in obedience and submission to mind and will dictation are voluntary and are the ones upon which eye movements are largely dependent in their achievements.

Activities in the sense of operations to achieve actuates growth of the parts brought into action and promotes skill, endurance, and power, and is an important factor in eye-culture. The organism is capable of great increase in strength, ease, rapidity and skill in doing according to habitual exercises, when it embraces quality, quantity and continuity of action within the range of its aptitude. The aptitudes are

inherent capabilities and the developments by activities are a series of upheavals.

The activities cause an increase of stimuli in nerve energy, and an increased flow of blood to the active parts, thus increasing the oxidization, relieving congestion and increasing muscular power and action. Activity differs widely in results in different individuals, but discipline of the muscular structure of any organ will usually improve flexibility in extension movements and power in contraction, accelerate circulation and increase oxidizing action, while inaction tends to weakness and atrophy of the parts involved whether it is from forced disuse or from voluntary non-action, and this holds good in the extrinsic and ciliary muscles of the eye.



GENERAL OCULO-DIDACTIC EXERCISES.



CHAPTER VIII.

No. 1. Direct a steadfast attention upon some distant object and with a **determined** will, **strive** to see **all** of the distinguishing details correctly. Carefully and determinedly exercise the judgment in estimating the size, shape, color, location, distance, and all peculiarities so as to be able to describe the objects accurately and fully.

This exercises the relation of mind, will and eye in seeing distant things. It is a reaching out, and the accommodation of parts to range of vision. It develops greater ease, rapidity and accuracy in focusing the eyes upon distant objects, and it also prevents many cases of acquired myopia, so prevalent among students. It is also a source of relief and rest to the eyes as well as a relaxation of mental tension.

No. 2. Concentrate attention with will in looking at various objects at different distances, changing from one to another and range from the most remote to within a few inches of the eye.

This disciplines the range and power of accommodation to more readily focus the eyes upon objects at various distances. It exercises flexibility and contractility of the muscles, and improves nerve energy and circulation as well as the range of visual field.

No. 3. Fix the gaze upon some distant object directly in front, then without changing the position of the head, turn the eyes steadily and carefully observe distant objects as the line of sight sweeps to the extreme range that the eyes will turn; then reverse the course and in like manner observe objects as the eyes are turned to the fullest ex-

tent in the opposite direction. Then exercise the eyes in looking upward and downward to the fullest range of view, without raising or lowering the head.

Such exercises discipline the associate relation of mind, will, nerve energy, circulation and muscular adjustment.

No. 4. Hold a small object directly in front of the face, say some twelve inches from the eyes. Fix the attention and sight steadfastly upon the object, then turn the head steadily and as far as possible in one direction, say to the right, and retain a steadfast view of the object. Now turn to the left. Follow the same proceeding, up and down. Then rotate and swing the face in a circular motion up, left, down and on to the right. Then reverse the order.

This exercise drills the involuntary adjustment of the eyes and muscular action of the neck, and relieves that rigidity which often leads to distress. It also disciplines the associate relation of ocular muscles with accommodation.

No. 5. Drill the eyes by voluntarily closing the lids of each eye, while holding the lids of the fellow-eye open and looking at some object with intent to see it fully.

This exercise develops independent activity of lids and relieves much of the relative rigidity evidenced in inability to close either eye and open the other with equal ease.

No. 6. Close the lids of one eye and exercise the associate eye as mentioned in exercises one, two and three, then change to the other eye in like manner.

This drill develops independent eye action, secures greater flexibility for associate adjustment of the two eyes and tends to exercise activity of both sides of brain.

No. 7. Hold the head steady, close one eye, then with one hand move a small object in a circular course so as

to exercise a full turn of the eye ball in order to see it. Then reverse the order and repeat a few times. Then change to other eye and exercise in like manner.

This increases independent activity to act in obedience to mind and will. In cases of corneal astigmatism, a gentle pressure with a wad of cotton, or some other flexible pad, upon the closed lid, as the globe is rotated, tends to true the surface of the corneal, especially in the eyes of children.

No. 8. Hold two small objects directly in front of the face and fix a continuous gaze upon them, move them slowly and steadily apart, one to the right, and the other to the left, and follow the right object with the gaze of right eye and the other object with the gaze of the left eye. Move them in various ways, and exert will to follow one object with one eye, and the other with the opposite eye.

This disciplines the field of vision to perceive and conceive more than one object at the same time. Exercise in viewing two objects at the same time tends to develop ability in complex observation.

No. 9. Fix the line of sight upon some object directly in front of the face, then move the hands from back of a line with the ears forward slowly until the movements of the fingers can be seen without changing the line of sight. Then exercise similar tests from over and under the eyes, also from other angles.

This stimulates the peripheral edge of the visual field, which is not as acute or reliable as the central portion. In this way peripheral vision can be improved in time.

No. 10. Hold two cards, with a hole in each, in front of the eyes, then move them slowly in various opposite directions as far as the line of sight can be independently directed through the respective holes for each eye.

This serves to exercise independent action and percept of each eye.

CHAS. H. TAYLOR'S Oculo-Didactic Charts

Chart No. 1

For Special Training and Exercises of Various Muscles.

¶ An original and unique chart for special eye training and the exercise of various muscles and of accommodation. ¶ By special letter and figure arrangements the essential factors of mind and will exercise urged by Dr. Taylor are accomplished simultaneously, with exercise of extrinsic muscles. The arrangement and directions are so simple that by following instructions of the specialist a child can exercise any one muscle or set of muscles. ¶ ¶ ¶

Price 50 Cents

§ § §

Chart No. 2

For General Eye Training.

¶ This is a 7x11 chart on heavy board with ten half tones from original poses, under the supervision of Dr. Taylor, illustrating ten different movements used by the author in general eye exercises, in office, homes and schools. Full and complete instructions with each. An excellent and attractive chart for schools. Nothing like it on the market. ¶ ¶ ¶

Price 50 Cents

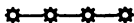
FOR SALE BY

Optometry Publishing Company
KANSAS CITY, MO.

OPTOMETRY QUIZ-COMPEND

BY

C. WEILL TALBOT, M. D.



THE FIRST TEXT BOOK OF THE
KIND FOR OPTOMETRISTS.
COVERS ALL SUBJECTS IN
OPTOMETRY, OPTICS AND
OPHTHALMOLOGY, THE ONLY
COMPLETE, UP-TO-DATE, COM-
PREHENSIVE LIST OF QUES-
TIONS BY STATE BOARDS OF
EXAMINERS, WITH ANSWERS
OF A DEPENDABLE NATURE.

ISSUED BY

OPTOMETRY EDUCATIONAL BUREAU

PRICE TWO DOLLARS

PUBLISHED BY

OPTOMETRY PUBLISHING COMPANY

KANSAS CITY, MO.

COPYRIGHT. ALL RIGHTS RESERVED.

SKIAMETRY

STATIC AND DYNAMIC



CONCISE AND PRACTICAL IN-
STRUCTION IN METHODS OF
USING THE RETINOSCOPE—
EMBRACING BOTH STATIC AND
DYNAMIC PROCEDURES. : :

BY

WILLIAM B. NEEDLES,

ISSUED BY

OPTOMETRY EDUCATIONAL BUREAU

PRICE ONE DOLLAR

PUBLISHED BY

OPTOMETRY PUBLISHING COMPANY

KANSAS CITY, MO.

COPYRIGHT. ALL RIGHTS RESERVED.

FUNDAMENTAL OPTICS

BY

GEORGE A. ROGERS

A new book for beginners and students, with all technical and algebraic terms eliminated. Just the sort of a simplified treatise optometrists, ophthalmologists and opticians have been looking for. Professor Rogers is acknowledged to be one of the best posted men in the United States in this phase of optics. ❧ ❧

ISSUED BY

OPTOMETRY EDUCATIONAL BUREAU

PRICE \$1.50

PUBLISHED BY

OPTOMETRY PUBLISHING COMPANY

KANSAS CITY, MO.

COPYRIGHT. ALL RIGHTS RESERVED.

RE 925
T31

This book is due on the last date stamped below, or on the date to which renewed.
Renewed books are subject to immediate recall.

[illegible]

General Library
University of California
Berkeley

U.C. BERKELEY LIBRARIES



0025941389



C



